



Foodborne Illness Information

from the Working Group on Foodborne Illness Control

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Massachusetts Department of Public Health

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Monthly Statistics

Number of Complaints of Foodborne Illness Received by the Working Group on Foodborne Illness Control (Confirmed and Unconfirmed)				
Month	Single Reports (one person ill)		Multiple (two or more people ill)	
	2003	Average (1997-2002)	2003	Average (1997-2002)
January	21	17	14	12
February	17	18	10	13
March	10	21	6	14
April	19	20	4	11
May	17	22	16	12
June	30	21	12	8

Laboratory Confirmed Cases Reported to the Division of Epidemiology and Immunization.					
Month	<i>Campylobacter</i>		<i>Salmonella</i>		Shiga-toxigenic <i>E. coli</i>
	2003	Ave. (1997-2002)	2003	Ave. (1997-2002)	2003
January	74	70	54	67	2
February	54	65	43	65	0
March	58	82	60	76	0
April	59	89	52	89	2
May	86	117	95	102	5
June	84	161	95	138	4

What's New in Foodborne Illness: Outbreaks and Information

Suspect *Clostridium perfringens* outbreak



On October 4, 2002, Boston Inspectional Services Department received an email from a consumer reporting that 6-7 people had become ill after sharing a meal with 20 people. The food had been prepared at a Boston restaurant and had been brought into their office for a meeting. Foods served included grape leaves, rice, chicken, lamb, kafta, falafel, hummus, babghanouj, taboulleh, salad, and baklava. One of the cases was contacted by phone and reported that the ill people experienced symptoms of diarrhea, nausea, abdominal cramps and fever that began 11-13 hours after the meal. The symptoms lasted 1 to 2 days and no one

sought medical attention. According to the initial email complaint, only those who ate lamb became ill, while many who ate the kafta or chicken instead of the lamb did not become ill.

Left over food was available for testing and was brought into the Food Microbiology Laboratory at the State Laboratory Institute. Cooked grape leaves, roast lamb, red sauce, kafta and white sauce were analyzed. The Food Laboratory routinely performs coliform counts and standard plate counts and other tests as indicated. Due to the onset and nature of the symptoms in this outbreak, the food was also tested for *Clostridium perfringens*.

C. perfringens was cultured from the roast lamb at a level of 8,900,000 per gram. *C. perfringens* was

also cultured from the kafta but at a much lower level of 87,000 per gram. In addition, the red sauce had an estimated standard plate count of 2,600,000 per gram, and the white sauce had an estimated standard plate count of 57,000,000 per gram as well as a high total coliform count of 2,600 per gram with fecal coliforms <10 per gram. The very high level of *C. perfringens* in the lamb is at a pathogenic level. Small amounts of *C. perfringens* may be found in food without causing illness, but when found at a level above 10,000 per gram in an epidemiologically implicated food, it is strong evidence that the food caused the illness. In addition, the high standard plate counts in the two sauces may be an indication of poor food handling practices.

The environmental investigation revealed many significant violations especially concerning hot holding temperatures. Lamb on a steam table was found to be at 90°F. Rice was found at 110 °F, chicken at 110 °F and kafta patties were at 115 °F. Hot foods must be held at 140 °F or higher in order to prevent the proliferation of pathogens. In this outbreak, it is probable that the improper hot holding of the lamb allowed for the outgrowth of *C. perfringens* spores to pathogenic levels.

In this outbreak, the combination of the reported symptoms, the lab results and the environmental investigation makes it very likely that these patrons suffered from *C. perfringens* toxicoinfection from eating the lamb from this Boston establishment.

C. perfringens is a significant cause of foodborne illness in the United States and is estimated to result in

250,000 cases each year. It should be suspected as a cause of an outbreak based on the incubation period, type of symptoms and foods eaten. The most common symptoms are diarrhea with abdominal cramps. Fever and vomiting are rare. Symptoms typically begin 8-22 hours after ingestion of the offending food and usually last no more than 24 hours.

Clostridium perfringens is present in soil and also in the gastrointestinal tracts of healthy animals and humans. It is thought to be naturally present in many foods. The foods most commonly associated with outbreaks are cooked meats, gravy and casseroles. Since it is a spore-former, *C. perfringens* can survive high temperatures during initial cooking. The spores can then germinate during cooling of the food, and if the food is improperly held at temperatures between 60°F-125°F (16°C-52°C), the vegetative forms can multiply to high levels. If the food is then served without adequate reheating, these live vegetative forms may be ingested and can then produce the toxin that causes diarrhea and abdominal cramping. Therefore, the best way to prevent illness from this pathogen is proper cooling, proper hot and cold holding, and thorough reheating of foods.

For more information about *Clostridium perfringens* see <http://www.cfsan.fda.gov/~mow/chap11.html>

Foodborne Illness Investigation and Control Procedures:

Collecting Stool Samples from Food Employees: Why, When and How



Testing food employees for enteric infection is a critical part of a thorough foodborne illness investigation. Infected food workers can be a cause of foodborne illness outbreaks. Testing not only helps determine the source of the outbreak, but it also helps to ensure that food employees are not currently infected and do not pose an ongoing threat to the public's health. Many food employees eat at the establishment at which they work and may become infected along with patrons. Failure to identify these workers and keep them from working could result in further outbreaks of foodborne illness. Needless to say, there is often significant initial resistance from both employers and employees when requested to submit stool samples; however, most will comply once they understand the importance of testing and

the procedures for submitting the samples. Good preparation can make the process go more smoothly.

Stool samples are not collected from food employees in all outbreak investigations. The decision to test is based on the epidemiology of the outbreak and is decided on a case-by-case basis. The seriousness of the illness, number of people ill, population affected, symptoms and diagnosis are factors used to determine whether to test food employees. Testing should also be done when there is a strong suspicion that food employees were the source of infection or became infected during the outbreak. For example, if patrons became ill after eating at the same establishment but ate there on different days, then employees must be ruled-out as a source of the infection. Staff from the Division of Epidemiology and Immunization (EPI) and the Division of Food and Drugs (DFD) will help local health agents determine whether testing food employees is indicated.

The Diagnostic Laboratories at the State Laboratory Institute (SLI) can test for many bacterial pathogens and is in the process of validating a test for noroviruses as well. The laboratory routinely cultures for *Salmonella spp.*, *Shigella spp.*, *Campylobacter spp.*, and *E. coli* O157:H7. They can also look for *Yersinia spp.*, *Vibrio spp.* and Shiga-toxin if indicated. On occasion, the laboratory will also screen for *Bacillus cereus*, *Staphylococcus aureus* and *Clostridium perfringens*.

Norovirus testing will be done only when there is good epidemiological evidence that the foodborne outbreak is viral in nature. A viral cause is suspected if the onset of illness is between 12 and 48 hours, the duration of illness is 12 to 60 hours, vomiting is a common symptom and no bacterial cause has been identified. The decision to test for norovirus will be made by DFD and EPI in consultation with the laboratory.

Once the decision is made to test food employees, the process should begin as soon as possible to reduce the possibility of transmission of infection. In addition, food employees may be the only source for identifying an etiologic agent, and as time goes on, shedding of organisms in stool will decrease, and the chances of finding any positives will diminish.

The first step in the collection process is to educate management about the importance of testing so that they become a help and not a hindrance. It is difficult to collect stool efficiently without their cooperation, so it is important to explain to them why stool testing is needed and how it should be done. It is no surprise that most managers will resist asking their employees to submit stool samples. If, however, the time is taken to explain the reasons for the testing, most managers will do their best to ensure that their staff complies.

When talking with the management, it is very important to assure them that testing of food employees is standard procedure, that the purpose of testing is not to assign blame, and that they are not being singled out. It is simply one part of the investigation. It is also important to explain to them the importance of demonstrating that they currently have no infected food employees working so that the establishment can continue to operate safely. One outbreak in a lifetime is usually enough for any manager! It can also be pointed out that compliance with this request is a show of good faith that the establishment is working with the health department.

If, however, the management remains uncooperative, the request for stool samples should be put in writing. Use an Order for Correction letter that informs the employer that the health department has the authority to require the testing of food employees and can exclude them from work if they don't submit the required stool samples. Time is of the essence when testing food em-

ployees so don't delay in writing the letter and giving it to the manager. Contact DFD for a copy of a model Order for Correction letter if needed.

Collecting stool samples is relatively straightforward, however the procedures for bacterial testing differ from that for viral testing and have slightly different submission requirements. If both bacterial and viral testing is going to be done, both submission procedures must be explained very carefully to the employees since they will be required to submit two samples in slightly different ways.

For bacterial testing, there is a special collection kit that is specifically designed for enteric pathogen testing.

The kits are available from SLI, and staff from DFD or EPI can assist in getting the kits to the local health department. The kits consist of a plastic tube containing a special transport medium and come with two outer metal containers for safe transport. The employee needs to produce a dime-sized sample of stool and place it in the transport medium. Once the sample is in the plastic container, it should be tightly shut. Any leakage of sample will invalidate the test and the employee will be required to resubmit.

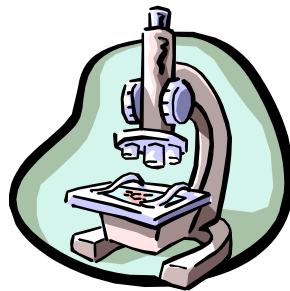
Once the sample is placed in the transport medium, it should be kept at room temperature and NOT be refrigerated. Although it will keep at room temperature for 5 days, it should be sent to SLI as soon as possible.

Unlike bacterial testing, no transport medium is needed for norovirus testing. To test for norovirus, SLI needs 10-50 ml (at least 2 teaspoons) of a fresh stool sample in a sterile container. Containers are available from SLI, but sterile urine cups can also be used. The employees should be instructed to put their samples in the refrigerator as soon as they collect them. The samples should be kept cold until they reach SLI. Samples for viral testing should be submitted to the laboratory as soon as possible and preferably within 2 days of collection.

Whether testing for bacteria or norovirus, make sure the employees know to submit stool and not urine! Every so often a urine sample is submitted by mistake.

Employees should be given 24 to 48 hours to submit stool samples. They are not expected to produce a sample on the spot! Employees who fail to submit stool specimens within that time period should be restricted from work until they comply. Many establishments, however, employ part-time workers or have workers with irregular schedules, and there is often an understandable delay in adhering to that time frame. Efforts should be made to notify these workers as soon as possible about this requirement. If after 48 hours, compliance is poor, don't hesitate to give the manager an Order for Correction letter if one has not already been provided.

Whether testing for bacteria or for norovirus, all samples must be properly labeled with the employee's first and last name and the establishment's name and town.



A sample submission form comes with the enteric kit and must be filled out and submitted with the sample. The same form can be used for both viral and bacterial testing, and if both samples are submitted at the same time, the form only needs to be filled out once. Failure to properly label a sample or to fill out the form will invalidate the sample, and the food employee will be required to resubmit.

In outbreak investigations in which food employees are being tested, samples should be collected from all employees who contact food, clean utensils, clean equipment, clean linens or single-service/single-use articles. This usually means the entire staff, including bartenders, wait staff, hosts and hostesses, dishwashers and managers. Everyone must be tested so that any pathogens present will not be allowed to persist among the staff.

In outbreak investigations in which the etiology is unknown or a viral etiology is suspected, food employees will be required to produce one stool sample that is negative for bacterial pathogens. If norovirus is strongly suspected, they may also be required to submit an additional sample for viral testing. If, however, bacterial illness has been confirmed or is strongly suspected, employees will be required to produce two consecutive stool samples that are negative for bacterial pathogens. It is best to let employees know this up front so that they will be prepared to give two samples. The two samples must be collected at least 24 hours apart, so it is recommended that employees be given one collection kit at a time to ensure that they aren't simply splitting a sample. They should receive a second collection kit only when they have returned the first sample.

Keeping track of all these tests can be quite a challenge. To make this job easier, it is very important to have an accurate list, including first and last names, of all the food employees who will be submitting samples. The enteric laboratory at SLI must get a copy of the list so that they can track the submissions too. However, the local health agent has the primary responsibility for making sure all the employees submit the required stool samples. To help keep track of the submissions, there is a Stool Sample Submission Tracking Form available on the web at <http://www.state.ma.us/dph/fpp/retail/investigations.htm>.

It is strongly recommended that one person, either from the establishment or from the health department, be responsible for ensuring that all employees submit stool samples. Often, the manager can be trusted to do this, but the health agent must verify that all employees have complied. The health agent is also responsible for getting the samples to the laboratory and can bring the samples to SLI, mail them in or arrange for them to be sent by courier. Even though the enteric kits come with individual mailers, it is not advisable to trust employees to mail their own, since this practice often results in an unusually high number of samples being "lost in the mail".

While the stool samples are being collected and tested, the food employees are usually allowed to keep

working as long as they are not symptomatic. Employees with gastrointestinal symptoms must not be allowed to work until they produce the required negative stool samples. Occasionally, when there is a strong suspicion that the employees are the source of the outbreak, they will all need to be excluded, even if they have no symptoms, until they test negative. In most cases, this will result in the closing of the establishment.

Employees who test positive for a bacterial enteric pathogen should not be allowed to work, even if they have no symptoms. They can only return to work after producing two consecutive negative stool samples. If they have been treated with antibiotics, they cannot submit stool samples until 48 hours after they finish their medication. Sometimes employees prefer to do the follow-up testing with their private physicians. If they do, the health agent must see a copy of the laboratory reports showing the negative stool culture results before allowing the employee to return to work.

Employees who test positive for norovirus are allowed to return to work 72 hours after their symptoms stop. If they had no symptoms, they can return to work 72 hours after their sample was collected.

Testing food employees is a crucial part of a foodborne illness outbreak investigation. It is critical for determining the cause of the outbreak as well as ensuring that the workers in the establishment do not pose an ongoing threat to public health. While many people initially resist providing a sample, with persistence and patience it is possible to get 100% compliance.



Food Safety Web Links: Highlights of the Month

FBI Outbreak Report:

"Foodborne Transmission of Hepatitis A— Massachusetts, 2001"
MMWR, Vol. 52, No. 24, June 20, 2003, pp. 565-567, available on line at:
<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5224a2.htm>

This MMWR article summarizes an outbreak of Hepatitis A in Massachusetts which was ultimately traced to a local food establishment.

FBI Statistics:

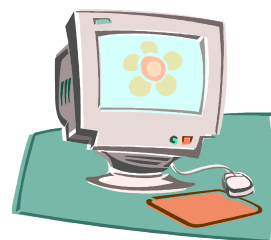
Mead, Paul, et al. "Food-Related Illness and Death in the United States," Emerging Infectious Diseases, Vol. 5, No. 5, September-October, 1999
available on line at:
<http://www.cdc.gov/ncidod/eid/vol5no5/mead.htm>

This article provides the most comprehensive estimate of the burden of foodborne illness in the United States. The Emerging Infectious Diseases journal is published by CDC and provides cutting edge information about emerging infectious diseases including many foodborne diseases.

Food Safety:

Gateway to Government Food Safety Information:
www.foodsafety.gov

This website is a portal to food safety information from federal and local governments. It includes information from USDA, FDA, EPA, CDC as well as links to state health departments. Much of the information is appropriate for regulators and consumers alike.



Division of Epidemiology and Immunization

Division of Food and Drugs

Bureau of Laboratories

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